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SOLAR OBSERVATIONS

SOLAR AND SKY RADIATION MEASUREMENTS DURING SEPTEMBER, 1926

By HERBERT H. KIMBALL, Solar Radiation Investigations

For a description of instruments and exposures and an account of the method of obtaining and reducing the measurements, the reader is referred to the REVIEW for January, 1924, 52:42, January, 1925, 53:29, and July, 1925, 53:318.

TABLE 1.—Solar radiation intensities during September, 1926

[Gram calories per minute per square centimeter of normal surface]

WASHINGTON, D. C.

Date	Sun's zenith distance											Local mean solar time
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon	
	75th mer. time	Air mass										
		A. M.					P. M.					
		e.	5.0	4.0	3.0	2.0	1.0	2.0	3.0	4.0	5.0	
Sept. 8	mm.	cal.		cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.	
11	11.38			0.61	0.78						12.24	
15	7.87		0.90	1.00	1.18	1.41					8.18	
20	10.21		0.69	0.86			1.08	0.84	0.69	0.58	10.59	
25	15.65		0.37								11.81	
Means			0.68	0.82 (0.98)	(1.41)	(1.08)	(0.84)	(0.69)	(0.58)			
Departures			-0.09	-0.05	-0.06	+0.09	+0.03	+0.00	-0.03	-0.08		

MADISON, WIS.

Sept. 9	7.29				1.28	1.50	1.28			7.29
	10	6.50		1.10	1.27	1.46	1.22			7.04
	18	16.79			0.89	1.10				16.79
	20	10.21				1.41	1.20			7.87
25	3.99			1.18	1.31	1.46				3.45
Means				(1.14)	1.19	1.39	1.23			
Departures				+0.11	+0.02	+0.01	+0.07			

TABLE 1.—Solar radiation intensities during September, 1926—Con.

LINCOLN, NEBR.

Date	Sun's zenith distance											
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon	
	75th mer. time	Air mass										Local mean solar time
		A. M.					P. M.					
		e.	5.0	4.0	3.0	2.0	1.0	2.0	3.0	4.0	5.0	
Sept. 6	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.	
9	10.97			1.08	1.18						13.61	
10	7.57		1.07	1.20	1.32	1.50	1.25	1.02	0.86		6.27	
25	8.81		0.91	1.02	1.20	1.41	1.05	0.97	0.83	0.71	9.83	
	3.63		1.12	1.24	1.38	1.59	1.36	1.21	1.09	1.00	2.74	
Means			1.03	1.14	1.27	1.50	1.22	1.07	0.93 (0.86)			
Departures			+0.16	+0.13	+0.08	+0.10	+0.07	+0.09	+0.09	-0.02		

† Extrapolated.

TABLE 2.—Solar and sky radiation received on a horizontal surface

[Gram-calories per square centimeter of horizontal surface]

Week beginning—	Average daily radiation					Average daily departure from normal		
	Washington	Madison	Lincoln	Chicago	New York	Washington	Madison	Lincoln
	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.
Sept. 3	280	288	370	192	270	-112	-88	-67
10	303	289	325	245	404	+20	-60	-86
17	317	282	264	242	244	-43	-45	-126
24	221	209	287	128	142	-126	-97	-83
Deficiency since first of year on Sept. 30						-3,899	-147	-1,897

From Table 1 it is seen that solar radiation intensities averaged slightly below the normal for September at Washington, D. C., and above normal at Madison, Wis., and Lincoln, Nebr. At Lincoln an intensity of 1.48 gram calories per minute per square centimeter measured at 10.30 a. m. of the 25th equals the highest intensity ever measured at that station in September. Throughout the entire day the intensity was very high, and only slightly lower in the afternoon than in the morning. At Madison, an intensity of 1.44 gram-calories at 11.45 a. m. of the 9th is only about 1 per cent less than the previous September maximum.

551.506 (261.1) WEATHER OF NORTH ATLANTIC AND ADJACENT OCEANS

NORTH ATLANTIC OCEAN

By F. A. YOUNG

September was marked by an unusual degree of storm activity in tropical regions of the North Atlantic. In addition to the hurricane which devastated Miami on the 18th there were no fewer than four other storms of tropical origin. The hurricane of the 4th-21st was notable both for its length of life and widespread influence on shipping and was also responsible, in all probability, for the loss of two ships, the American steamship *Haleakala*, on the 9th and the British steamship *Loyal Citizen* on the 14th.

The first telegraphic indications of this hurricane to reach the Weather Bureau were received on the 8th and 9th, but reports subsequently received by mail show that it was in existence as early as the 4th. On this date the British steamship *Stornest*, bound from Newport News to Santos, came under its influence and on the early morning of the 5th experienced full hurricane winds. From the latter date it moved on a northwesterly course with diminishing speed and reached a position about 300 miles west of Bermuda on the 14th, whence it began to recurve.

On the 14th the British steamship *Mayaro* was in the calm center of the hurricane from 10.15 a. m. to 4 p. m. In a special report to the Weather Bureau Capt. A. Y. Drysdale states that he was surprised to find the sea within the center so moderate that a small boat could have been used with perfect safety. The atmosphere was "clammy and stuffy" and the weather cleared so that blue sky appeared in patches. Captain Drysdale was able to obtain sights to determine the position of his vessel—31° 49' N., 69° 11' W.

On the morning of the 14th, while the hurricane just described was southwest of Bermuda, telegraphic reports reaching the bureau indicated the existence of another disturbance about 200 miles northeast of St. Kitts. This moved rapidly west-northwestward and passed near Turks Island on the afternoon of the 16th. A special observation from that place, the last to be received until October 6, showed a pressure of 29.62 inches and a wind velocity of 100 miles an hour from the northwest.

This hurricane continued to move rapidly and reached the southeastern Florida coast on the morning of the 18th, the center passing directly over the city of Miami, where a Weather Bureau station is located. There was a lull in the wind of about 35 minutes, commencing at 6.45 a. m., and the barometer fell to 27.61 inches, the lowest pressure ever registered at a Weather Bureau station in the United States. Continuing its northwestward movement the hurricane reached the vicinity of

Table 2 shows a deficiency in the amount of radiation received on a horizontal surface from the sun and sky at all three stations due to excessive cloudiness.

At Washington the polarimeter was out of adjustment during most of the month. A reading obtained on the 8th gave a polarization of skylight of 51 per cent. Measurements made on four days at Madison give a mean of 70 per cent, with a maximum of 72 per cent on the 11th. The maximum is close to the average maximum for September at Madison; the mean is considerably higher than the September mean.

Pensacola and Mobile on the morning of the 20th. It dissipated to the northwest of New Orleans on the 22d. An account of this hurricane will appear in the October issue of the REVIEW.

On the 12th, while the first hurricane of the month was still south-southwest of Bermuda, a disturbance appeared near Swan Island, in the western Caribbean Sea, and moved northeastward over Cuba. After pursuing an irregular course and without attaining great intensity it dissipated over the southeastern Gulf of Mexico on the 17th. On the 12th, also, a fourth storm, this one of full hurricane intensity, appeared east of Bermuda, moving in a northeasterly direction. This storm was short lived, reports showing little evidence of its existence after the 13th.

On the 25th a fifth disturbance of tropical origin appeared southwest of the Azores, moving on a northeasterly course. On the 26th the station at Horta reported northerly winds reaching a maximum velocity of 76 miles an hour. By 4 p. m. of that day the center appeared to be somewhat north of the islands, the pressure at Horta having risen from 29.45 to 29.54 inches and the wind shifted to northwest. During the following 24 hours the center appears to have moved westward, or possibly southwestward, and to have increased in intensity. At 4 p. m. on the 27th the pressure at Horta had fallen to 29.18 inches, wind southeast, force 8. At 6 a. m. on the 28th the pressure at Horta was 29.08 inches, wind east-southeast, force 5. After this time conditions gradually moderated. A report from the French steamship *Sinara*, which was involved in this storm, will be found in the accompanying table.

TABLE 1.—Averages, departures, and extremes of atmospheric pressures at sea level, 8 a. m. (75th meridian), North Atlantic Ocean, September, 1926

Stations	Average pressure	Departure ¹	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Julianehaab, Greenland	29.57	(²)	30.12	22d	28.79	27th.
St. Johns, Newfoundland	29.97	-0.03	30.32	7th	29.36	23d.
Nantucket	30.13	+0.09	30.36	15th	29.86	13th.
Hatteras	30.08	+0.05	30.22	24th	29.94	2d.
Key West	29.93	-0.04	30.06	1st	29.50	18th.
New Orleans	29.98	-0.01	30.12	25th	29.50	21st.
Swan Island	29.81	-0.08	29.90	1st	29.70	18th.
Bermuda	30.08	+0.03	30.30	25th	29.92	13th.
Horta, Azores	30.02	-0.14	30.46	4th	29.26	28th.
Lerwick, Shetland Islands	29.88	+0.04	30.22	1st	29.52	12th.
Valencia, Ireland	30.11	+0.12	30.42	22d	29.74	18th.
London	30.11	+0.11	30.44	1st	29.78	12th.

¹ From normals shown on H. O. Pilot Chart based on observations at Greenwich mean noon, or 7 a. m., 75th Meridian.

² Mean of 27 observations; three days missing.

³ No normal established.

⁴ And on other dates.